

NOTES ON COPEPOD PARASITES OF POLYCHAETE WORMS IN SCOTTISH WATERS

Including the first UK records of the Californian copepod *Spiophanicola spinosus* Ho, 1984
(Poecilostomatoida: Spiophanicolidae).

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Until recently records of copepod parasites of polychaete worms in British waters have been relatively scarce (O'Reilly, 1991). The publication of a synopsis of commensal and parasitic copepods associated with British marine invertebrates (Gotto, 1993) has added impetus to their study in UK waters. A number of new finds have since come to light in the course of benthic macrofaunal monitoring surveys (O'Reilly, 1995a, b, c, Ooishi, 1996).

In June 1987 as part of routine biological monitoring of Lothian Region sewage disposal grounds, approximately 17 km north of St Abbs Head in the Forth Sea Area, grab samples of benthic invertebrates were collected. Among the thousands of polychaetes examined a small number were observed with copepod parasites. These included the Bamboo Worm, *Rhodine gracilior* Tauber, 1879, of which 11 specimens were accompanied by two different species of clausiid copepod. One of these, *Rhodinicola elongata* Levinsen, 1878, had only rarely been recorded in British waters, whilst the other much larger species, *Megaclausia mirabilis* O'Reilly, 1995, was subsequently described as a new genus in a review of the family Clausiidae (O'Reilly, 1995a).

Also discovered in the same survey were several mature and ovigerous females of the highly degenerate copepod *Herpyllobius polynoës* (Kroyer, 1863) which parasitises scaleworms. (Figs. 1, 2 - see back cover). This bizarre copepod is composed of two body portions; an oval ectosoma, 1-2 mm in diameter, which protrudes from the host's head like a large lollipop, and a tongue-shaped endosoma, several millimetres long, which penetrates deep into the scaleworm's body alongside the alimentary tract, acting as an absorptive organ. There are no appendages whatsoever save for a pair of chitinous protuberances to which large ovisacs are attached in reproductive females. Altogether four specimens of *Gattyana*

cirrosa (Pallas, 1766) were parasitised, two with a single parasite and two with a pair of parasites. These represent the first Scottish east coast records (cited as south-east Scotland in Gotto, 1993).

In addition to the above, a juvenile specimen of the tube-dwelling polychaete *Spiophanes kroyeri* Grube, 1860, was recovered at the St. Abbs grounds (Stn. 11, 56°04.50'N, 02°09.04'W, 65 m depth) with a minute copepod attached dorsally (Fig. 3 - see back cover). The copepod, only 0.2 mm long, was evidently a very immature (copepodite) stage. Few morphological features were discernible, other than enlarged maxillipeds used to grasp its host. As it was not readily referable to any British species, it was put to one side in the hope that further finds of mature specimens might shed light on its identity.

Almost 5 years later, in April 1992, following a survey around a sewage discharge of Ironotter Point, Greenock, a second specimen of this unusual copepod was recovered (CRPB Stn. E1, 55°58.33'N, 04°48.20'W, 20 m depth, see O'Reilly *et al.*, 1997). This specimen, an adult female 2.5 mm long, retaining a single damaged ovisac (Fig. 4 - see back cover), and also attached to the dorsum of *Spiophanes kroyeri*, was identified as *Spiophanicola spinosus* Ho 1984, the sole member of the family Spiophanicolidae described 8 years earlier from the Californian coast.

Spiophanicola spinosus has an elongate body divisible into head, trunk, and tail. The head has well developed first and second antennae plus prominent prehensile maxillipeds. The oral appendages are minute as are the 5 pairs of legs on the elongated trunk region. The tail comprises the genital segment and a truncated abdomen terminated by a pair of short caudal rami. The paired ovisacs are attached laterally to the genital

Figure Legends - see back cover

- Fig. 1** *Herpyllobius polynoës* - female with single ovisac, attached to *Gattyana cirrosa*. The head of the scaleworm is obscured by the parasite. Only a single anterior scale remains on the worm - visible to the left of the copepod parasite.
- Fig. 2** *Herpyllobius polynoës* - close up of female attached to *Gattyana cirrosa*. The single ovisac is attached to one of the chitinous protuberances.
- Fig. 3** *Spiophanicola spinosus* copepodite attached to dorsum of juvenile *Spiophanes kroyeri* from St. Abbs disposal grounds.
- Fig. 4** Dorsal view of female *Spiophanicola spinosus* with single egg string, attached to fragment of *Spiophanes kroyeri* from Greenock, Firth of Clyde.
- Fig. 5** *Spiophanicola spinosus* - mature female, lateral view, from off the Northumberland coast.
- Fig. 6** *Spiophanicola spinosus* - mature female, ventral view, from off the Northumberland coast.

segment. They are usually at least as long as the body and composed of a single string of eggs, a relatively unusual feature among invertebrate associated copepods.

The discovery of *S. spinosus* in Scottish waters, briefly cited by O'Reilly (1995c), appears to represent the first find of this species since its type description from California. Coincidentally Ho (*loc. cit.*) also found his material as a result of a sewage discharge monitoring survey and similarly in association with the polychaete *S. kroyeri* and 2 other allied *Spiophanes* species.

Three further records of *S. spinosus* have since come to light from North Sea surveys: 1 mature female, 2.5 mm long (Figs. 5, 6 - see back cover), detached from any host collected in Jan. 94 about 10 miles off Cullercoats, Northumberland (Dove Marine Lab., Stn. 30, 80 m depth, see O'Reilly & Geddes (in press)), 1 mature female, 1.5 mm long, attached to *S. kroyeri* collected Aug. 95 in the northern North Sea (58°22'29"N, 00°50'32"E, Donan Field, 100-130 m. depth) and 1 badly damaged female, approximately 2.0 mm long, detached from host collected May 97 in the central North Sea (56°59.02'N, 02°15.20'E, Phillips Jade Field).

The occurrence of *S. spinosus* in British waters represents a considerable extension of its known range. However, it seems reasonable to assume that a creature with such clandestine habits has always been present and that its distribution probably matches that of its hosts. In British waters it appears to be restricted to *Spiophanes kroyeri* so far. The samples where detached parasites were recovered both had *Spiophanes kroyeri* present. However it is possible that *Spiophanes bombyx* (Claparede, 1870) might also serve as a host as both species often occur together. The paucity of records for *S. spinosus* may in part be explained by its apparent low infestation rates. In the St. Abbs survey 66 *S. kroyeri* and 300 *S. bombyx* were examined; at Ironotter Point over 660 *S. kroyeri* and 40 *S. bombyx* - all to reveal only 2 parasites. However it must be borne in mind that some parasites will inevitably become dislodged from their hosts during the process of sample sieving and fixing with formaldehyde preservative.

Little is known of the biology of *S. spinosus*. Ho (*loc. cit.*) found 8 ovigerous females all attached ventrally to their hosts. The 3 attached British specimens were located dorsally on their hosts, on setigers 15, 19+?, and 25 respectively. They were oriented with their heads positioned either anteriorly or posteriorly. It is probable that *S. spinosus* can move around on the surface of its host, perhaps scraping off mucus, although its actual feeding mode is not known. The male of *S. spinosus* has never yet been observed.

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McGinty of Fugro Ltd and to Phillips Petroleum for permission to cite the record from the Jade Field. The Scottish material is deposited in the National Museum of Scotland, Edinburgh (Accession Nos. NMS 1999.10-13) and the Northumberland specimen is placed in the British Museum (Natural History), London (Registration No. 1999.165).

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